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(58) Field of search
H5H
B1C

(54) Improvements in or relating to microwave ovens

(57) A microwave oven cavity (1) is provided with a conventional vertical rotational drive shaft (2) for rotating a bowl (7). The bowl (7) has a lid (8), which supports a stirring paddle (11) and is provided with a stopping arm (12) which abuts with a stopping bar (13) attached at (14) to a wall of the cavity (1). During use, gears (16, 17) and gearing track (15) around the rim of bowl (7) cause relative rotational movement between the bowl (7) and paddle (11), which effects agitation of any foodstuff, such as soups, sauces, etc., in the bowl (7), whilst the foodstuff is being cooked by microwave energy emitted into the cavity (1), as well as during periods when the foodstuff is not being cooked.

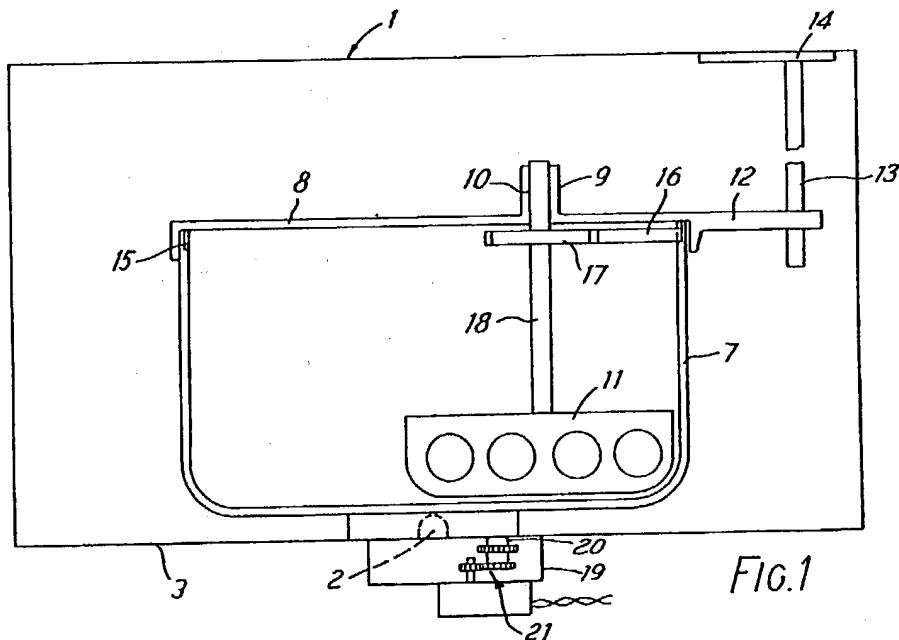
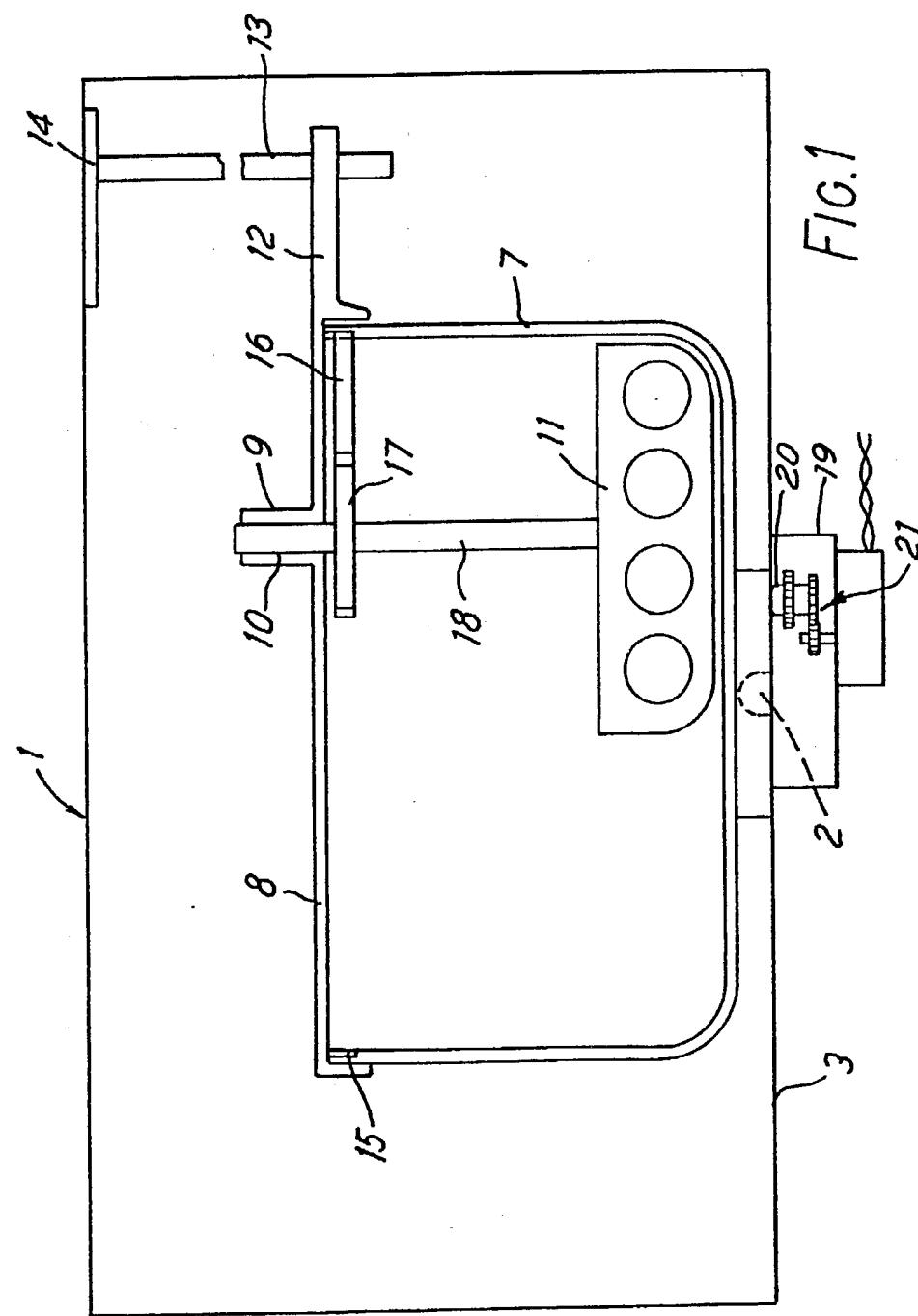


FIG.1

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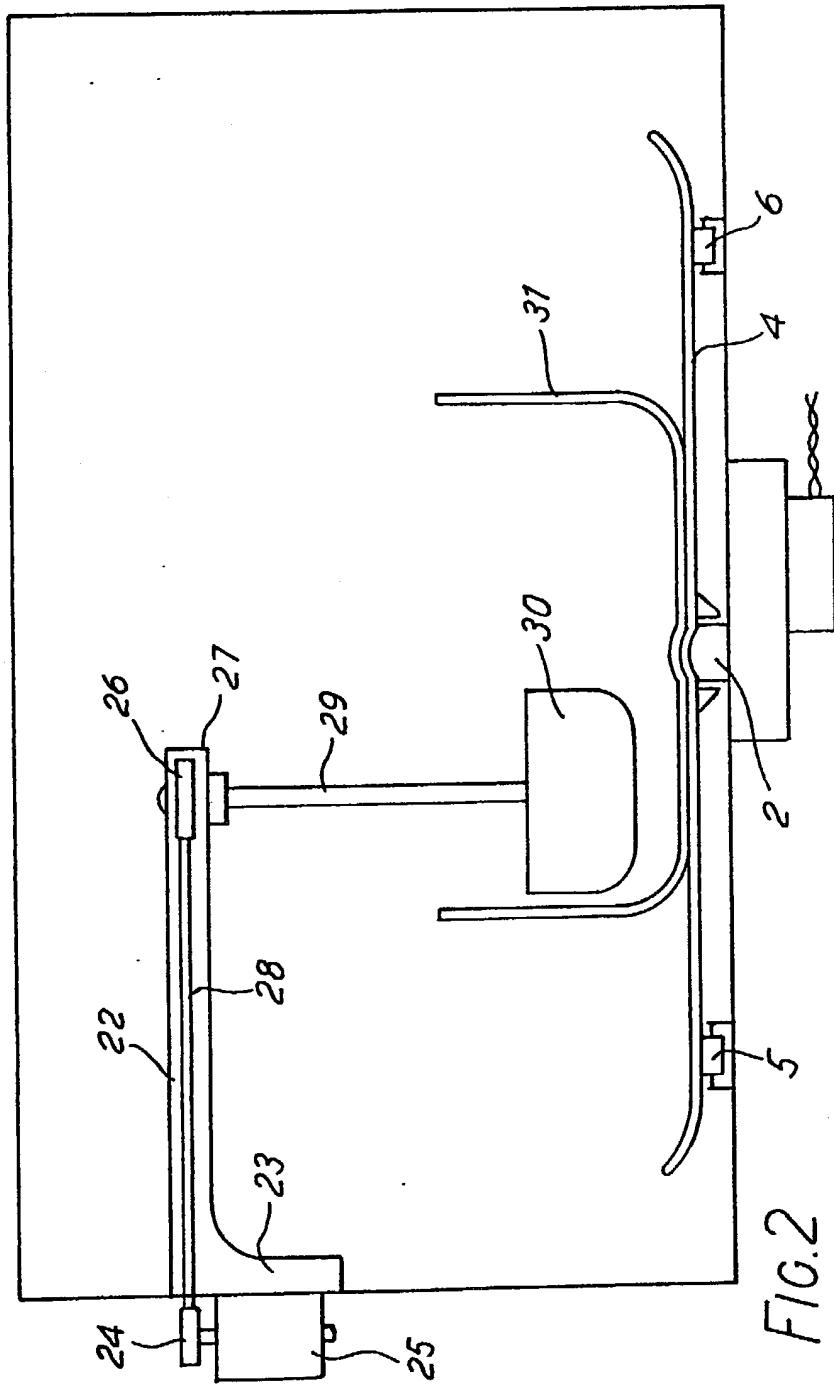


FIG.2

SPECIFICATION**Improvements in or Relating to Microwave Ovens**

This invention relates to improvements in microwave ovens.

5 Known microwave ovens usually include a turntable mounted on a drive shaft on the base of the oven cavity, upon which a vessel containing foodstuff to be cooked can be placed, so that rotation of the turntable, and thus of the vessel, 10 causes the foodstuff to be exposed to a substantially even distribution of microwave energy, thereby ensuring that the foodstuff is cooked to a substantially equal extent throughout its mass.

However, it is known that certain foodstuffs, such as 15 sauces, soups, jams, scrambled eggs, etc., require regular stirring during the cooking process, which thus necessitates repeated opening and closing of the door of the oven, thereby disrupting the cooking process, as well as requiring continuous attendance by the oven user.

It is therefore an object of the present invention to provide a microwave oven which alleviates substantially the above-mentioned problem.

According to a first aspect of the invention there is 25 provided a microwave oven including a stirring member arranged, in use, to extend into foodstuff contained in a vessel disposed within the oven cavity and drive means for providing relative movement between said stirring member and said vessel to effect agitation of said foodstuff.

Preferably the drive means consists of a vertical rotatable motor-driven drive shaft provided in the base of the oven cavity, upon which the vessel can be mounted for rotational drive.

30 The stirring member is preferably disposed in a generally vertical fixed position, and is preferably attached to a lid provided for the vessel, the vessel being capable of rotational movement relative to the lid.

35 A gearing mechanism may be provided between the inner rim of the vessel and the stirring member, so that rotational movement of the vessel effects rotational movement of the member about its vertical axis within the vessel.

40 According to a second aspect of the invention there is provided an arrangement suitable for attachment in a microwave oven including drive means, said arrangement comprising a vessel for containing foodstuff, a stirring member, and means for connecting at least one of said vessel and said stirring member to said drive means, so that, in use, relative movement between said vessel and said stirring member effects agitation of foodstuff contained in said vessel.

45 The invention will now be further described by way of example only with reference to the accompanying drawings, wherein:—

Figure 1 shows a schematic sectional view of one embodiment of the invention and

50 Figure 2 shows a schematic sectional view of a second embodiment thereof.

With reference to Figure 1, a microwave oven cavity 1, into which, during use, microwave energy is emitted from a magnetron (not shown) is

55 provided with a vertical rotational drive shaft 2, extending up through base 3 of the cavity 1. The usual purpose of drive shaft 2 is to drive for rotation a conventional turntable, shown at 4 in Figure 2, the turntable 4 having conventional load bearing rollers 5 and 6. However, in the embodiment shown in

70 Figure 1, the turntable has been removed and a bowl 7 has been mounted for rotational drive by the shaft 2.

The bowl 7 is provided with a lid 8, which has an upwardly-extending aperture 9, into which spindle 10 of a stirring paddle 11 is inserted, so that when the lid 8 is in position on the bowl 7, the paddle 11 extends downwardly into the interior of the bowl 7.

A stopping arm 12 is integrally formed with the lid 8 and is arranged to abut against a stopping bar 13, which is attached at one end 14 either permanently, by adhesive, etc., or detachably, by clips, etc., to an interior surface of the cavity 1 and extends downwardly into the cavity to meet the stopping arm 12.

85 The inner rim of the bowl 7 is provided with a gearing track 15, into which a gear 16 is meshed. The paddle spindle 10 is also provided with a gear 17, which is also meshed with gear 16.

90 In operation, the bowl 7 is driven by the conventional drive shaft 2, which thus causes the bowl 7 to rotate relative to the lid 8, which is prevented from rotational movement by the stopping arm 12 abutting against the stopping bar

95 13, which, in turn, prevents any movement of the paddle 11 from its fixed vertical position. However, rotational movement of the bowl 7 causes gears 16 and 17 to rotate, so that the paddle 11 rotates within the bowl 7 about its vertical axis 18, whilst remaining in an otherwise fixed position.

100 Due to the gears 16 and 17, the paddle 11 rotates about its axis 18 at a substantially higher speed, of for example at least 20 rpm, than the rotational speed of the bowl 7 about the shaft 2, which is approximately 5 rpm.

105 It can thus be envisaged that the relative rotational movement between the bowl 7 and the paddle 11 effects an agitation of any foodstuff, such as soups, sauces, jams, scrambled eggs, etc.,

110 contained in the bowl 7, which is capable of being implemented whilst the foodstuff is being cooked by microwave energy emitted into the oven cavity 1, as well as during periods when the foodstuff is not being cooked.

115 The usual rotational speed of the drive shaft 2, which is conventionally employed for rotating a turntable, may be considered too slow to effect efficient stirring of the foodstuff within the bowl 7, so that a two-speed gearbox 19 may be provided to

120 increase the rotational speed of the shaft 2 when the bowl 7 is mounted thereupon. This may be implemented by an actuating knob 20 which is depressed when the bowl 7 is mounted on the shaft 2, thereby causing internal gears 21 of the gearbox 19 to mesh.

125 Figure 2 shows a second embodiment of the present invention wherein a retracted arm 22 is attached at one end 23 to a side wall of the oven cavity 1. A wheel 24 is rotatably driven by a motor 25

and drives a wheel 26, provided in end 27 of the arm 22, via a belt 28 extending through the length of the arm 22. A spindle 29 of any suitable stirring paddle 30 is inserted into arm end 27, so that the paddle 5 extends down into a suitable bowl 31, and is rotatably driven by the motor 25, so as to effect a stirring action of foodstuff contained in the bowl 31.

The bowl 31 may itself be stationary or it may be rotatably driven by shaft 2, either directly as shown 10 in Figure 1 or indirectly, via turntable 4, as shown in Figure 2.

Alternatively, the bowl 7, shown in Figure 1, may be driven indirectly by shaft 2, via a turntable as shown in Figure 2.

15 The present invention may be further advantageous in a programmable microwave oven, which generally incorporates a microcomputer and a keyboard (not shown in the Figures), wherein the oven may be programmed with specific "food stirring time" instructions, for example, a duration of 20 secs. cooking by the microwave energy may be followed by a 20 sec. duration of stirring without cooking followed by a 30 sec. duration of cooking and stirring simultaneously.

20 25 Alternative techniques for achieving two-speed rotational drive of the drive shaft 2 (the lower speed being for rotation of the turntable and the higher speed being for stirring purposes) may include the provision of a hollow shaft rotatable at a first speed and a concentric central shaft rotatable at a second speed, or the implementation of an electrical method wherein the frequency of the power supply to the driving motor is varied by inclusion of additional electronic circuitry to vary the motor 30 output.

35 The foodstuff vessel, the stirring paddle and other associated operational components may be provided as an arrangement suitable for attachment in a conventional microwave oven, the arrangement 40 either being supplied with the oven or by itself as a supplementary attachment for the oven.

Numerous alternative embodiments may be of course be envisaged by persons of ordinary skill in the art, as long as there is sufficient relative 45 movement between the stirring paddle and the foodstuff vessel to effect agitation of the foodstuff without causing disruption of the cooking process of the foodstuff. It is envisaged, for example, that the stirring paddle may be driven by means including a device for utilising microwave energy derived from the magnetron and suitably converted.

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CLAIMS

1. A microwave oven including a stirring member arranged, in use, to extend into foodstuff contained 55 in a vessel disposed within the oven cavity and drive means for providing relative movement between said stirring member and said vessel to effect agitation of said foodstuff.

2. A microwave oven as claimed in Claim 1

60 65 70 75 80 85 90 95

wherein said drive means includes a first drive means comprising a vertical rotatable, motor-driven, drive shaft provided in the base of the oven cavity, said vessel being mounted upon said shaft for rotational drive thereof.

3. A microwave oven as claimed in Claim 1 or 2 wherein said stirring member is disposed in a generally vertical fixed position relative to said vessel.

4. A microwave oven as claimed in any preceding claim wherein said vessel is provided with a lid, said stirring member being attached to said lid and said vessel being capable of rotational movement relative to the lid.

5. A microwave oven as claimed in any preceding claim wherein a gearing mechanism is provided between the surface of the vessel and the stirring member, so that rotational movement of the vessel effects rotational movement of the member about its vertical axis within the vessel.

6. A microwave oven as claimed in any preceding claim wherein a second motor-driven drive means is provided within said oven cavity to effect movement of said stirring member.

7. A microwave oven substantially as herein described with reference to the accompanying drawings.

8. An arrangement suitable for attachment in a microwave oven including drive means, said arrangement comprising a vessel for containing foodstuff, a stirring member and means for connecting at least one of said vessel and said stirring member to said drive means, so that, in use, relative movement between said vessel and said stirring member effects agitation of foodstuff contained in said vessel.

Amendments to the claims have been filed, and have the following effect:—

Claim 8 above has been deleted

New or textually amended claims have been filed 100 as follows:—

8. In or for a microwave oven containing means for imparting a driving motion to a drive member accessible within the heating compartment of said oven, an attachment consisting, in combination, of a receptacle for foodstuff and stirring member constructed for co-operation with said receptacle to effect agitation of said foodstuff during exposure of said foodstuff to microwave radiation in said heating compartment, one of said receptacle and said stirring member being constructed to engage with said drive member and to be moved thereby relative to the other of said receptacle and said stirring member to effect said agitation, said heating compartment of said oven including means for 105 110 115 suitably locating said stirring member in relation to said receptacle during use of said attachment.